REMARKS

Claims 1, 5 and 6, all the claims pending in the application, are rejected. Claim 1 is amended. New claims 11 and 12 are added.

Support for Amendments

The limitations added to amended claim 1 are based on the description of the original claim 6 and/or on the description of page 6, lines 15-20 of the original specification.

New claim 11 is based on the description of page 15, lines 13-19 of the original specification.

New claim 12 is based on the description of the previously presented claim 6 and on the description of page 15, lines 13-19 of the original specification.

Claim Rejections - 35 USC § 103

Claims 1 & 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. US 2004/0058197 in view of Chang et al. US 7,081,268. This rejection is traversed for at least the following reasons.

Amended Claim 1

Claim 1 has been amended to specify that the claimed disk comprises (1) a substrate, (2) a soft magnetic layer of a material selected from a group consisting of an Fe-based material and a Co-based material on said substrate, and (3) a magnetic recording layer on said soft magnetic layer, wherein said magnetic recording layer comprises a ferromagnetic layer on said soft magnetic layer. The ferromagnetic layer is further specified as having a particular granular structure, as defined by additional limitations in the claim. This structure has particular value

Problems Identified

In defining the problems confronted by the present inventors and overcome by the invention, the inventors observe in paragraph [0006] (i.e. page 3, line 16 through page 4, line 3) of the original specification the desirability of certain features, namely:

"By adding an oxide such as SiO_2 to the CoPt-based perpendicular magnetic recording layer, the oxide such as SiO_2 is segregated at the grain boundaries to reduce the magnetic interaction between the crystal grains of the magnetic recording layer. Further, by the addition of

the oxide such as SiO_2, the crystal grain size can be reduced. By increasing the amount of SiO_2 added to the magnetic recording layer, the S/N ratio in high density recording is improved."

Further, as described in paragraph [0007] (i.e. page 4, lines 4-21) of the original specification, the inventors note a barrier to achieving the potential from the foregoing steps in teaching that:

"However, when aiming at a medium adaptable to 400Gbit/inch^2 or more, it is difficult to produce the medium excellent in thermal stability or recording properties only by adding the oxide such as SiO_2. That is, when, for example, the amount of SiO_2 is increased to 6at% or more, degradation occurs in coercive force Hc. Due to such reduction in coercive force Hc, the thermal stability degrades and the DC noise increases. On the other hand, as the amount of SiO_2 increases, the SNR (SN Ratio) becomes better."

Problems Solved - Features of the Claimed Invention

This invention uses a magnetic recording layer having a ***double-layered structure***, as recited in amended claim 1, to thereby increase the recording density by improving the S/N ratio in high density recording without causing an increase in DC noise and degradation in thermal stability (see: paragraph [0008] (i.e. page 4, line 22 through page 5, line 7) and paragraph [0024] (i.e. page 13, lines 5-9 from the bottom) of the original specification).

A Specific Double Layered Structure Is Claimed

More specifically, this invention uses the arrangement recited in the amended claim 1 of a magnetic recording layer on a soft magnetic layer, wherein the magnetic recording layer comprises a ferromagnetic layer ***having a granular structure*** and a layer, on the ferromagnetic layer, ***having no granular structure*** and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, $CoPt_3$, and $CoPd_3$ to thereby increase the recording density by improving the S/N ratio in high density recording without causing an increase in DC noise and degradation in thermal stability (see: paragraph [0010] (i.e. page 6, lines 15-20), the latter half (i.e. page 7, lines 16-22) of paragraph [0012], and the last sentence (i.e. page 8, lines 25-27 of the original specification) of paragraph [0015].

Nakamura et al

As to Claim 1, the Examiner describes, on page 2, line 5 from the bottom through page 3, line 6 of Item 2 of the Office Action, the asserted teachings in Nakamura et al and concludes that the structure is made in the order as claimed by the Applicant, based on the structure illustrated in Figure 3 of Nakamura et al.

Nakamura Does Not Show Claimed Structure

Notwithstanding the Examiner's assertions, Nakamura et al discloses in FIG. 3 and in Paragraph [0089] that the magnetic recording medium 60 comprises: a nonmagnetic substrate 61, a third soft magnetic laminate layer including a soft magnetic layer 62 formed on the nonmagnetic substrate 61, and a granular layer 65 formed on the soft magnetic layer 62, which consists of magnetic particles 63 and a nonmagnetic matrix 64 surrounding the magnetic particles 63, a perpendicular magnetic recording layer 66 formed on the granular layer 65, and a protective layer 67 formed on the perpendicular magnetic recording layer 66. Nakamura et al discloses, in fact that, in the magnetic recording medium 60, the third soft magnetic laminate layer ***includes*** the soft magnetic layer 62 ***and*** the granular layer 65. The perpendicular magnetic recording layer 66 does not include the granular layer 65.

Thus, Nakamura et al do not disclose the arrangement recited in the amended claim 1 of a magnetic recording layer on a soft magnetic layer, wherein the magnetic recording layer comprises a ferromagnetic layer having a ***granular structure*** and a layer, on the ferromagnetic layer, having ***no granular structure*** and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, $CoPt_3$, and $CoPd_3$.

Claimed Content of SiO_2 is not Disclosed

In addition, as is recognized by the Examiner on page 3, lines 8-9 from the bottom of the Office Action, Nakamura et al do not specify that the content of the SiO_2 in said ferromagnetic layer being 6at% or more, as described in the amended claim 1.

Claim 6

This claim would be patentable because it also specifies the formation of a double layered structure as in claim 1, with the accompanying content as claimed.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. US 2004/0058197 in view of Chang et al. US 7,081,268 and further in view of Ikeda et al. US 6,468,670. This rejection is traversed for at least the following reasons.

First, the claim is patentable over Nakamura et al because of its dependency from claim 1.

Second, neither of Chang et al or Ikeda et al remedy the deficiencies of Nakamura et al.

Chang et al

No Adjustment of SiO_2 Content

The Examiner also states at page 3, lines 5-8 from the bottom of the Office Action that Chang et al discloses a granular recording medium and further discloses adjusting the SiO_2 content of a CoCrPt alloy in obtaining a desired signal to noise ratio (SNR) (Col. 13, 14, Line 50-67, 1-6 respectively). However, Chang et al do not adjust the SiO_2 content of a CoCrPt alloy, but the SiO_2 content in the CoCrPt alloy is fixed and kept at 4 mol as "$(SiO_2)_4$" in Chang et al.

That is, Chang et al discloses, in the above-referred parts (Col. 13, 14, Line 50-67, 1-6 respectively), that FIG. 10(A) graphically illustrates the variation of signal-to-noise ratio (SNR) of $CoCr_6Pt_{18}$ $(SiO_2)_4O_x$ granular-type perpendicular magnetic recording media as a function of % oxygen content during in situ post-deposition oxidation treatment of the magnetic recording layer and that FIG. 10(A) illustrates the variation of SNR of $CoCr_6Pt_{18}$ $(SiO_2)_4O_x$ granular-type perpendicular magnetic recording media when the % O_2 content in the O_2/Ar gas mixture was varied from 0 to about 5 %. The SiO_2 content in the $CoCr_6Pt_{18}$ $(SiO_2)_4O_x$ granular-type perpendicular magnetic recording media is ***never increased*** but is fixed and kept at 4 mol as "$(SiO_2)_4$" after the oxidation treatment of the magnetic recording layer is carried out.

Claimed Content Not Disclosed

On the basis of the disclosure of only a fixed value, Chang et al cannot disclose "the content of the SiO_2 in said ferromagnetic layer being 6at% or more", as described in the amended claim 1.

Ikeda et al

Likewise, Ikeda et al does not disclose "the content of the SiO_2 in said ferromagnetic layer being 6at% or more", as described in the amended claim 1.

New Claims

On the basis of the foregoing arguments, Applicants submit that new method claim 12 would be patentable because it contains the limitations not found in any of the cited art, and that new claim 11 would be patentable because it depends from amended claim 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Alan J. Kasper/

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Alan J. Kasper
Registration No. 25,426

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